

WHAT IS CLAIMED IS:

1. An integrated type probe card comprising:

5 a plurality of probes;

a circuit space converter, said circuit space converter comprising multiple layers of circuits therein, and a plurality of first contacts and second contacts respectively arranged at two opposite sides of said multiple layers of circuits and electrically connected to the circuits, the density of said first contacts being higher than
10 said second contacts, said first contacts being respectively connected to said probes for transmitting signal from said probes to said second contacts;

a spring connector plate, said spring connector plate comprising a holder plate, said holder plate having a predetermined number of receiving holes extended through top and bottom sides thereof, and a plurality of metal spring members
15 respectively mounted in the receiving holes of said holder plate, said metal spring members each having two distal ends respectively protruded over the top and bottom sides of said holder plate and having one of the respective two distal ends respectively electrically connected to said second contacts of said circuit space converter;

a circuit board pressed on one of the two distal ends of each of said metal
20 spring members against the second contacts of said circuit space converter, said circuit board having a plurality of circuits and contacts arranged on one side thereof and electrically connected to said metal spring members of said spring connector plate for testing electric signal transmitted from said probes; and

a level adjustment mechanism adapted to hold said probes, said circuit space
25 converter, said spring connector plate and said circuit board in order and to adjust the

level status of said circuit space converter, for enabling said metal spring members to compensate elevational difference between said circuit space converter and said spring connector plate and to keep said circuit space converter electrically connected to said circuit board.

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2. The integrated type probe card as claimed in claim 1, wherein said probes are cantilever type probes.

3. The integrated type probe card as claimed in claim 1, wherein said probes
10 each have a free end shaped like a quadrilateral prism.

4. The integrated type probe card as claimed in claim 1, wherein said probes are made from nickel cobalt alloy.

15 5. The integrated type probe card as claimed in claim 1, wherein said circuit space converter comprises a multiplayer ceramic substrate, which has the multiple layers of circuits of said circuit space converter arranged therein and the first contacts and second contacts of said circuit space converter respectively arranged at two opposite sides thereof.

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6. The integrated type probe card as claimed in claim 5, wherein said circuit space converter further comprises a plurality of probe holders formed on the top side of said multiplayer ceramic substrate for the bonding of said probes.

25 7. The integrated type probe card as claimed in claim 6, wherein said probe

holders are formed on the top side of said multiplayer ceramic substrate by electro-forming by means of LIGA (Lithography process).

8. The integrated type probe card as claimed in claim 6, wherein said probe
5 holders are made from nickel cobalt alloy.

9. The integrated type probe card as claimed in claim 1, wherein said holder plate of said spring connector plate is made from an electrically insulative material.

10 10. The integrated type probe card as claimed in claim 1, wherein said metal spring members are pogo pins.

11. The integrated type probe card as claimed in claim 1, wherein said metal spring members are compression springs.

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12. The integrated type probe card as claimed in claim 1, wherein said level adjustment mechanism is comprised of a holding down plate, a back plate, an adjustment plate, a front locating plate, and a plurality of differential adjustment devices, said back plate and said adjustment plate being arranged in a stack and
20 fastened together with fastening members, said front locating plate being fastened to said back plate to hold said circuit board in between said front locating plate and said back plate, said front locating plate having a center receiving open chamber adapted to accommodate said spring connector plate and a recessed positioning portion formed in one side there around said center receiving open chamber and adapted to accommodate
25 said circuit space converter, said holding down plate being fastened to said front

locating plate and having a test space and a plurality of protruding press portions suspended around said test space and pressed on the periphery of said circuit space converter to hold said circuit space converter in the recessed positioning portion of said front locating plate and to let said probes protrude over the test space of said holding
5 down plate.

13. The integrated type probe card as claimed in claim 12, wherein said differential adjustment devices are arranged in three sets each comprising a round ball put in said front locating plate and a differential screw fastened to said adjustment plate
10 and pressed on said round ball against said circuit space converter.

14. The integrated type probe card as claimed in claim 12, wherein said holding down plate is a spring plate.

15 15. The integrated type probe card as claimed in claim 1, wherein said circuit space converter comprises a multiplayer circuit board, which has the multiple layers of circuits of said circuit space converter arranged therein and the first contacts and second contacts of said circuit space converter respectively arranged at two opposite sides thereof.

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16. An integrated type probe card fabrication method comprising the steps of:

(a) preparing a circuit space converter, which comprises multiple layers of circuits arranged therein and a plurality of first contacts and second contacts
25 respectively arranged on two opposite sides thereof at different densities and

respectively connected to said multiple layers of circuits, and then connecting a plurality of probes to said first contacts of said circuit space converter respectively;

(b) preparing a spring connector plate comprised of a holder plate and a plurality of metal spring members, said holder plate having a plurality of receiving
5 holes extended through top and bottom sides thereof, said metal spring members being respectively mounted in the receiving holes of said holder plate and having each two distal ends respectively protruded over the top and bottom sides of said holder plate;

(c) preparing a circuit board having circuits on one side thereof for receiving signal from said probes and contacts at the circuits, and then pressing said
10 circuit board on said metal spring members against said second contacts of said circuit space converter to keep the contacts of said circuit board in contact with said metal spring members for receiving signal from said probes; and

preparing a level adjustment mechanism to accommodate said spring connector plate and said circuit board and to adjust the level status of said circuit space
15 converter, said level adjustment mechanism being comprised of a holding down plate, a back plate, an adjustment plate, a front locating plate, and a plurality of differential adjustment devices, said back plate and said adjustment plate being arranged in a stack and fastened together with fastening members, said front locating plate being fastened to said back plate to hold said circuit board in between said front locating plate and
20 said back plate, said front locating plate having a center receiving open chamber adapted to accommodate said spring connector plate and a recessed positioning portion formed in one side there around said center receiving open chamber and adapted to accommodate said circuit space converter, said holding down plate being fastened to said front locating plate and having a test space and a plurality of protruding press
25 portions suspended around said test space and pressed on the periphery of said circuit

space converter to hold said circuit space converter in the recessed positioning portion of said front locating plate and to let said probes protrude over the test space of said holding down plate, said differential adjustment devices being arranged in three sets each comprising a round ball put in said front locating plate and a differential screw
5 fastened to said adjustment plate and pressed on said round ball against said circuit space converter.

17. The integrated type probe card fabrication method as claimed in claim 16, wherein the density of said first contacts is higher than the density of said second contacts.